In the Claims:

Please amend Claims 18-25 and 27 as indicated below. The status of all claims is as follows:

1. - 3. (Cancelled)

4. (Previously Presented) A method of determining a magnitude of a sensing current to be supplied to an electromagnetic transducer, comprising:

supplying an electric current of a first current value to the electromagnetic transducer;

determining a physical quantity appearing in the electromagnetic transducer based on the electric current of the first current value;

supplying an electric current of a second current value, different from the first current value, to the electromagnetic transducer;

determining the physical quantity appearing in the electromagnetic transducer based on the electric current of the second current value;

deriving a variation in temperature of the electromagnetic transducer based on the change in the physical quantity;

determining the magnitude of the sensing current based on a derived variation in temperature of the electromagnetic transducer;

deriving an expected lifetime of the electromagnetic transducer based on the variation in temperature when determining the magnitude of the sensing current;

comparing the expected lifetime with a predetermined target upper limit lifetime; and

adding an incremental value to a preceding second current value so as to set a new

second current value if the expected lifetime takes a value exceeding the predetermined target upper limit lifetime.

5. (Original) The method of determining according to claim 4, wherein said predetermined upper limit lifetime represents a sum of a minimum lifetime required to the electromagnetic transducer and a margin to be added to the minimum lifetime.

6. (Original) The method of determining according to claim 5, wherein said incremental value is stepwise reduced as the preceding second current value gets larger.

7. - 8. (Cancelled)

9. (Previously Presented) A method of determining a magnitude of a sensing current to be supplied to an electromagnetic transducer, comprising:

supplying an electric current of a first current value to the electromagnetic transducer;

calculating a first electric resistance value of the electromagnetic transducer based on a first voltage value appearing in the electromagnetic transducer in response to supply of the electric current of the first current value;

supplying an electric current of a second current value, different from the first current value, to the electromagnetic transducer;

calculating a second electric resistance value of the electromagnetic transducer based on a second voltage value appearing in the electromagnetic transducer in response to supply of the electric current of the second current value;

calculating a quantity of variation in temperature of the electromagnetic transducer based on the first and second electric resistance values;

determining the magnitude of the sensing current based on a calculated quantity of variation in temperature of the electromagnetic transducer;

deriving an expected lifetime of the electromagnetic transducer based on the quantity of variation in temperature of the electromagnetic transducer when determining the magnitude of the sensing current;

comparing the expected lifetime with a predetermined target upper limit lifetime; and

adding an incremental value to a preceding second current value so as to set a new second current value if the expected lifetime takes a value exceeding the predetermined target upper limit lifetime.

10. (Original) The method of determining according to claim 9, wherein said predetermined upper limit lifetime represents a sum of a minimum lifetime required to the electromagnetic transducer and a margin to be added to the minimum lifetime.

11. (Original) The method of determining according to claim 10, wherein said incremental value is stepwise reduced as the preceding second current value gets larger.

12. - 15. (Cancelled)

16. (Original) A method of determining a magnitude of a sensing current to be supplied to an electromagnetic transducer for reading data, comprising:

supplying an electric current of a first current value to the electromagnetic transducer for reading data;

determining a physical quantity appearing in the electromagnetic transducer for reading data based on the electric current of the first current value;

supplying an electric current of a second current value, different from the first current value, to the electromagnetic transducer for reading data;

supplying an electric current of a predetermined current value to an electromagnetic transducer for writing data, which is paired with the electromagnetic transducer for reading data;

determining the physical quantity appearing in the electromagnetic transducer for reading data based on the electric current of the second current value; and

determining the magnitude of the sensing current based on change found in the physical quantity.

17. (Original) The method of determining according to claim 16, further comprising:

calculating a first electric resistance value of the electromagnetic transducer based on a first voltage value appearing in the electromagnetic transducer in response to supply of the electric current of the first current value;

calculating a second electric resistance value of the electromagnetic transducer based on a second voltage value appearing in the electromagnetic transducer in response to supply of the electric current of the second current value; and

calculating a quantity of variation in temperature of the electromagnetic transducer based on the first and second electric resistance values in determining the magnitude of the sensing current.

18. (Currently Amended) A method of determining a magnitude of a sensing current to be supplied to an electromagnetic transducer, comprising:

supplying an electric current of a first current value to the electromagnetic transducer;

determining a physical quantity appearing in the electromagnetic transducer based on the electric current of the first current value;

supplying an electric current of a second current value, different from the first current value, to the electromagnetic transducer;

determining the physical quantity appearing in the electromagnetic transducer based on the electric current of the second current value;

determining a numerical value of a variation in temperature of the electromagnetic transducer based on the change in the physical quantity; and

determining the magnitude of the sensing current based on a determined numerical value of the variation in temperature of the electromagnetic transducer.

19 (Currently Amended) The method of determining according to claim 18, further comprising determining a numerical value of an expected lifetime of the electromagnetic transducer based on the numerical value of the variation in temperature when determining the magnitude of the sensing current.

20. (Currently Amended) The method of determining according to claim 18, wherein the numerical value of the variation in temperature is determined by utilizing a temperature coefficient, and the temperature coefficient has a value depending on a material included in the electromagnetic transducer.

21. (Currently Amended) A method of determining a magnitude of a sensing current to be supplied to an electromagnetic transducer, comprising:

supplying an electric current of a first current value to the electromagnetic transducer;

calculating a first electric resistance value of the electromagnetic transducer based on a first voltage value appearing in the electromagnetic transducer in response to supply of the electric current of the first current value;

supplying an electric current of a second current value, different from the first current value, to the electromagnetic transducer;

calculating a second electric resistance value of the electromagnetic transducer based on ~~the first and second electric resistance values; and~~ a second voltage value appearing in the electromagnetic transducer in response to supply of the electric current of the second current value;

determining a numerical value of a variation in temperature of the electromagnetic transducer based on the first and second electric resistance values; and

determining the magnitude of the sensing current based on a ~~calculated quantity of~~ determined numerical value of the variation in temperature of the electromagnetic transducer.

22. (Currently Amended) The method of determining according to claim 21, further comprising determining a numerical value of an expected lifetime of the electromagnetic

transducer based on the ~~quantity of~~ numerical value of the variation in temperature of the electromagnetic transducer when determining the magnitude of the sensing current.

23. (Currently Amended) The method of determining according to claim 21, wherein the numerical value of the variation in temperature is calculated in accordance with the following equation:

$$\Delta T = \frac{R - R_{ini}}{R_{ini}} \gamma$$

where ΔT indicates the numerical value of the variation in temperature, R_{ini} indicates the first electric resistance value, R indicates the second electric resistance value and γ indicates a temperature coefficient.

24. (Currently Amended) The method of determining according to claim 21, wherein the numerical value of the variation in temperature is calculated by utilizing a temperature coefficient, and the temperature coefficient has a value depending on a material included in the electromagnetic transducer.

25. (Currently Amended) A computer-readable storage medium containing program instructions for determining a magnitude of a sensing current to be supplied to an electromagnetic transducer, comprising:

computer program code causing a computer to supply an electric current of a first current value to the electromagnetic transducer;

computer program code causing a computer to determine a physical quantity appearing in the electromagnetic transducer based on the electric current of the first current value;

computer program code causing a computer to supply an electric current of a second current value, different from the first current value, to the electromagnetic transducer;

computer program code causing a computer to determine the physical quantity appearing in the electromagnetic transducer based on the electric current of the second current value; ~~and~~

computer program code causing a computer to determine a numerical value of a variation in temperature of the electromagnetic transducer based on the change in the physical quantity; and

computer program code causing a computer to determine the magnitude of the sensing current based on ~~a change of the physical quantity.~~ a determined numerical value of the variation in temperature of the electromagnetic transducer.

26. (Previously Presented) The computer-readable storage medium according to claim 25, wherein said storage medium is a memory chip incorporated in a magnetic disk drive.

27. (Currently Amended) ~~The computer-readable~~ A computer-readable storage medium ~~according to claim 25, further containing program instructions comprising:~~ containing program instructions for determining a magnitude of sensing current to be supplied to an electromagnetic transducer, comprising:

computer program code causing a computer to supply an electric current of a first current value to the electromagnetic transducer;

computer program code causing a computer to calculate a first electric resistance value of the electromagnetic transducer based on a first voltage value appearing in the electromagnetic transducer in response to supply of the electric current of the first current value;

computer program code causing a computer to supply an electric current of a second current value, different from the first current value, to the electromagnetic transducer;

computer program code causing a computer to calculate a second electric resistance value of the electromagnetic transducer based on a second voltage value appearing in the electromagnetic transducer in response to supply of the electric current of the second current value; and

computer program code causing a computer to ~~calculate a quantity of~~ determine a numerical value of a variation in temperature of the electromagnetic transducer based on the first and second electric resistance ~~values in determining the magnitude of the sensing current.~~ values; and

computer program code causing a computer to determine the magnitude of the sensing current based on a determined numerical value of the variation in temperature of the electromagnetic transducer.

28. (Previously Presented) The computer-readable storage medium according to claim 27, wherein said storage medium is a memory chip incorporated in a magnetic disk drive.